

Table 2-10: “ADDRESS QUALIFIER” Encoding

Address Qualifier (binary)			Address Qualifier (decimal)	Address Type	Reference subparagraph
Bit 6	Bit 7	Bit 8			
0	0	0	0	ADS-B target with ICAO 24-bit address	2.2.4.5.1.3.1
0	0	1	1	ADS-B target with self-assigned temporary address	2.2.4.5.1.3.2
0	1	0	2	TIS-B target with ICAO 24-bit address	2.2.4.5.1.3.3
0	1	1	3	TIS-B target with track file identifier	2.2.4.5.1.3.4
1	0	0	4	Surface Vehicle	2.2.4.5.1.3.5
1	0	1	5	Fixed ADS-B Beacon	2.2.4.5.1.3.6
1	1	0	6	(Reserved)	
1	1	1	7	(Reserved)	

2.2.4.5.1.3 “ADDRESS” Field Encoding

The “ADDRESS” field is a 24-bit (bit 1 of byte 2 through bit 8 of byte 4) field used in conjunction with the “ADDRESS QUALIFIER” field to identify the participant. The meaning of the “ADDRESS” field depends on the “ADDRESS QUALIFIER” field as described in §2.2.4.5.1.3.1 through §2.2.4.5.1.3.6.

2.2.4.5.1.3.1 ICAO 24-bit Aircraft Address of Transmitting Aircraft

An “ADDRESS QUALIFIER” value of ZERO (binary 000) **shall** indicate that the message is an ADS-B Message from an aircraft, and that the “ADDRESS” field holds the ICAO 24-bit address that has been assigned to that particular aircraft. The ICAO Aircraft Address **shall** be stored (or “latched”) in the UAT Transmitting System upon Power Up.

If the Address Selection Input is set to the “ICAO,” then the ADS-B Transmitting Subsystem **shall** declare a device failure in the event that it’s own ICAO 24-bit Address (i.e., the Mode-S Address) is invalid, unavailable, or set to all “ZEROS” or all “ONES.”

Note: *The world-wide method for allocating and assigning the 24-bit ICAO aircraft addresses is described in Annex 10 to the Convention on International Civil Aviation, Volume III, Chapter 9. [ICAO Annex 10, Vol. III, Ch. 9].*

2.2.4.5.1.3.2 Self-Assigned Temporary Address of Transmitting Aircraft

An “ADDRESS QUALIFIER” value of ONE (binary 001) **shall** indicate that the message is an ADS-B Message from an aircraft that is not receiving ATC services, and that the “ADDRESS” field holds the transmitting aircraft’s self-assigned ownship temporary address. An “ADDRESS QUALIFIER” value of ONE shall not be used when the “Receiving ATC Services Flag” (§2.2.4.5.4.13.3) is set to ONE, indicating that the Participant is receiving ATC services.

The self-assigned temporary address **shall** be generated as follows:

- Let: ADDR_P = the ICAO 24-bit address that has been assigned to the aircraft;
 ADDR_T = the temporary address that is to be generated;
 M(1) = the 12 least significant bits (LSBs) of the ownship “LATITUDE” field (per §2.2.4.5.2.1) ~~at~~ the first time the temporary address option is selected;
 M(2) = the 12 least significant bits (LSBs) of the ownship “LONGITUDE” field (per §2.2.4.5.2.1) ~~at~~ the first time the temporary address option is selected;
 M(3) = $4096 \times M(1) + M(2)$; and
 TIME = the number of seconds that have elapsed since UTC midnight ~~at~~ the first time the temporary address option is selected, represented as a 24-bit number.

Also, let “ \oplus ” denote the modulo 2 bit-by-bit addition (or “exclusive OR”) operation.

- a. If the transmitting aircraft’s ICAO 24-bit address ADDR_P is available, then the temporary address ADDR_T **shall** be the modulo 2, bit-by-bit summation of the permanent address and M(3), that is:

$$\text{ADDR}_T = \text{ADDR}_P \oplus M(3).$$

- b. If the aircraft’s 24-bit ICAO address ADDR_P is not available, then time of day **shall** be used as an additional randomizer. In that case, the temporary address ADDR_T **shall** be the modulo 2, bit-by-bit summation of TIME and M(3), that is,

$$\text{ADDR}_T = \text{TIME} \oplus M(3).$$

Note: *Analysis indicates that the probability of two aircraft in the same operational area having identical ADDR_T values should be well below the observed probability of having duplicate ICAO 24-bit addresses owing to installation errors.*

2.2.4.5.1.3.3 ICAO 24-bit Aircraft Address of TIS-B Target Aircraft

An “ADDRESS QUALIFIER” value of TWO (binary 010) is used to indicate that the message is for a TIS-B target and the “ADDRESS” field holds the ICAO 24-bit address that has been assigned to the target aircraft being described in the message.

Note: *The world-wide scheme for allocating and assigning the 24-bit ICAO aircraft addresses is described in Annex 10 to the Convention on International Civil Aviation, Volume III, Chapter 9. [ICAO Annex 10, Vol. III, Ch. 9]*

2.2.4.5.1.3.4 TIS-B Track File Identifier

An “ADDRESS QUALIFIER” value THREE (binary 011) is used to indicate that the message is for a TIS-B target and that the “ADDRESS” field holds a TIS-B track file identifier by which the TIS-B data source identifies the target aircraft being described in the message.